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USSR Report

ENERGY

No. 58

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ELECTRIC POWER

INTERVIEW WITH KAZAKH SSR MINISTER OF POWER AND ELECTRIFICATION

Moscow KRASNAYA ZVEZDA in Russian 14 Jan 81 p 2

[Article: "The Minister Answers the Question. The Fires of Ekibastuz"]

> [Text] Dear editor! The necessity of continuing the construction of large GRES's [state regional electric power stations] in the Ekibastuz Region was noted in the project plan of the CPSU Central Committee for the 26th Party Congress. Please tell about this key construction project and what the creators of this power engineering giant in northern Kazakhstan are working on today.

(G. Fadeyev, Captain of Militia).

KRASNAYA ZVEZDA correspondent, Major A. Ladin, asked the Minister of Power Engineering and Electrification of the Kazakh SSR, B.P. Ivanova, to answer our reader's question.

"There are lines in the Leninist GOELRO [State Commission for the Electrification of Russia] plan in the section "The Electrification of Western Siberia" in which the considerable importance of the Ekibastuz pits near Pavlodar is underscored," said Boris Petrovich. "The widescale working of this deposit started in 1948. At the present time, the nation receives more than 50 million tons of inexpensive fuel annually from Ekibastuz."

A decision was made a few years ago to construct four powerful electric power stations in this region, with an overall design capacity of 16 million kilowatts. Yet another electric power station is under construction southwest of Lake Balkhash. Electrical power transmission lines are being strung, the largest of which is designed to feed direct current at a voltage of 1,500 kilovolts from Ekibastuz to Tsentr. In all, 7,700 kilometers of electrical power transmission lines will be built.

The Ekibastuz fuel and power engineering complex is a new giant step in the development of domestic electrical power engineering. Much here remains to be constructed and applied for the first time. We will point out that custom-made electrical power equipment for the high voltages of 1,500 kilovolts DC and 1,150 kilovolts AC is being created for the first time in the world, as well as the latest structural designs for switchgear and electrical power transmission lines.

The pace of construction of the first electric power station increases every month. Its second power unit, for example, went on line much more rapidly than the first. Its construction was also managed much less expensively. But in this important matter, the reserves are still far from exhausted.

The task is set in the project plan of the CPSU Central Committee for the 26th Party Congress: accelerate the construction of thermal electric power stations including the Ekibastuz stations. We see the ways of solving this problem in further improving labor organization at all levels, a clear cut coordination between all links in the construction project as well as providing it with everything required at precisely the schedules times. We will in the future, as the party requires, also achieve an improvement in planning, the organic interaction of the plan, the economic levers and stimuli as well as the forms of incintives for workers and the widescale expansion of socialist competition.

In our opinion, matters will move much more rapidly if we are successful in creating solid staffs of specialists at all construction sites, who would not work as personnel who are brought in from the outside, but would rather represent our own Ekibastuz construction and installation organizations, which we do not as yet have.

I would like to mention yet another reserve which would serve to accelerate the pace of construction of the Ekibastuz complex. This is the maximum utilization of the possibilities of a regional production and component packaging base. What does this represent? In essence, a plant which is entirely independent, placed alongside the construction site. It is already managing the consolidation of the station units and checking them to see that they will fit into the installation. All of this is accomplished by special brigades in closed rooms, where it is warm. The impact of the introduction of the high speed flow line installation method has been considerable.

Work at any construction site, including the Ekibastuz site, depends to no small degree on how the contractual obligations are met by the suppliers. We are grateful to the collective of the Podol'sk Machine Construction Plant imeni Ordzhonikidze. It is providing us with high quality product, at times ahead of the planned schedule. And then the Belgorod Power Engineering Machine Construction Plant at times interrupts the shipment of necessary assemblies for the station. Besides this, the equipment frequently arrives disassembled. Doing the additional work on the assemblies at the site takes a lot of time.

For the first time, four high power thermal electric power stations are being constructed in our nation in a comparatively small area. In this regard, many problems come up related to protecting the environment against pollution. What is being done for this? Two-stage cleaning of the exhaust gas is provided at all stations of the complex. One is based on the water-mechanical principle: dust precipitates on the moist internal walls of an ash catcher-scrubber, and is then washed by water in special receivers. The other stage is equipped with electrical precipitating filters. The charged particles of ash adhere to the electrodes. They are periodically shaken off and the ash is thereby removed from the cleaning installation. Thus, the exhaust gases are 99.5 percent cleaned of solid impurities. The high smokestacks of the electric power stations make it possible to reduce the concentration of the emissions.

Much has been done since the construction start of the GRES-1 at Ekibastuz to improve the living, cultural and everyday conditions of the power engineering workers. Several apartment houses with an overall area of 207,000 square meters have been constructed, as well as three kindergartens, schools, stores and dining halls. A self-service department store and automatic telephone exchange are being readied for final acceptance. The construction of a house of culture and a sports complex with a swimming pool has been stepped up. Great prospects are opened up for Ekibastuz by the decree of the CPSU Central Committee and the USSR Council of Ministers on the comprehensive construction project for the city. Energograd in the Pavlodar Priirtysh' will not only be a developed economic center, but also one of the most well equipped and beautiful cities in northern Kazakhstan.

However, it cannot be said that there is nothing in this plan that bothers us. We would like for the pace of the residential construction not to lag behind the pace of construction of thermal power stations themselves. Not everything has been done for the rapid and comfortable delivery of builders and installation workers of the GRES to their work areas. There are also other problems which require priority solutions.

The necessity of devoting primary attention to providing providing for the timely placement of the production capacities in service and the concentration of capital investments and material resources in the most important construction projects is noted in the project plan of the CPSU Central Committee for the 26th Party Congress in the section on "Capital Construction". In my opinion, it must be pointed out here that in the construction of such large facilities as the ETEK [Ekibastuz Thermal Power Engineering Complex], special concern should be given to the residential, cultural, and everyday living conditions of the builders, installation workers and their families.

In conclusion, I would like to say that our ministry is making a great effort to see that this most important assignment of the party and the Soviet government is executed with high quality and within the set deadlines. The startup of three more power sets of the GRES-1 is upcoming 1981. The work is going ahead at all of the construction sites of the complex in an animated and battle ready atmosphere. The builders, installation workers and other specialists, among whom there are no small numbers of recent servicemen, have accepted the elevated obligations and are fully resolved to meet the regular 26th Congress of the CPSU with new labor successes for the good of the beloved motherland.

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FUTURE DEVELOPMENT PLANS FOR ELECTRIC POWER SYSTEMS DISCUSSED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 30 Jan 81 p 2

[Article by V. Venikov, professor, doctor of the engineering sciences and winner of the Lenin Prize: "Thinking About the Future"]

[Text] Let us take a look at how the large electrical power systems are being planned today for the newly developed rayons, oblasts or the entire nation; the approach does not change with the scale. Initially, as a rule, a structural configuration is analyzed. It is composed of filaments: substations, distribution stations and transmission lines with parameters which are known beforehand, where all these series produced. However, despite the apparent simplicity of such an approach, this path is incorrect, since it stimulates superfluous formalism, and incites designers to orient their work towards the equipment of today, which will be obsolete tomorrow. Moreover, such an approach does not stimulate the manufactures of electrical engineering equipment to the very rapid mastery of new technology. Because of this, I proposed that section IV of the plan of the CPSU Central Committee be supplemented as follows: "Improve the quality of the project planning for industrial systems by managing it as physical and technical planning, and not just as structural economic planning, taking an orientation in this case to a greater extent towards new equipment and putting it in production".

The justified (but frequently incorrectly understood) warning to avoid "futurology" in forecasting and design leads to the fact that engineers and project planners ignore the possibilities of technological development.

Thus, in its own time, the decision was made to use a voltage of 10 KV in municipal and agricultural power networks. The use of a voltage of 20 KV was rejected, since calculations performed without an analysis of future technology, and which were oriented towards the characteristics of existing equipment, for which price lists were available, demonstrated the economic inexpediency of increasing the voltage. In the meanwhile, as is absolutely clear today, the increased voltage would have made it possible to avoid those enormous loses which the use of the 10 KV voltage entails.

I propose that the following be entered in the project plan for the Major Trends: "Continue work on the formation of the USSR Unified Power System (YeES SSSR), taking into account the AC 750 and 1,150 KV electric power transmission lines forming the grid as well as the 1,500 KV DC lines, and for the long term, 1,600 KV AC and 2,000 KV DC".

We shall consider another problem. We have practically had no "peak load" electric power stations in our power systems up to the present time, the main form of which are pumped water storage stations (GAES's), which fill special basins during the low load period, which make it possible to obtain additional capacities during load "peaks". The Kiev GAES may be disregarded because of its small capacity while the Zagorskaya station has been planned and under construction for many years now, and the end is still not in sight. And are such stations needed? There can be two opinions on this account. But why then is such a cool attitude towards them observed? Because during the structural economic planning without a physical and technological forecast, which would have indicated the necessity of designing GAES's on a large scale, it turned out that they are expensive. And now the design of these GAES's is underway throughout the world on a wide scale, while our designers cannot overcome the psychological barrier they have erected themselves.

I proposed that in the document under consideration, the layout of pumped storage electric power stations should be specified precisely and a provision made for the design of the power and hydraulic engineering equipment for these stations, which operate under complex natural conditions.

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ELECTRIC POWER

ELECTROSILA POWER GENERATION EQUIPMENT PRODUCTION ASSOCIATION DISCUSSED

Leningrad LENINGRADSKAYA PRAVDA in Russian 20 Jan 81 p 2

[Article by B. Fomin, general director of the "Elektrosila" association: "From Peak to Peak"]

[Text] There is only one direction in the development of science and engineering: a reciprocating motion forward, from one conquered peak to the other. There are no few glorious pages in the annals of the labor accomplishment of the "Elektrosila" collective, starting with the generators for the Volkhovskaya hydroelectric power station and finishing with the custom-made 1,200,000 kilowatt capacity plant for the Kostromskaya electric power station. The 10th Five-Year Plan is an especially bright page. During the plan, 192 turbogenerators with an overall capacity of 44 million kilowatts were manufactured, as well as 45 hydroelectric generators with an overall capacity of 9 million kilowatts, 15,200 large electrical machines, low voltage equipment worth 129 million rubles and no small amount of consumer goods.

It is a characteristic feature that all of the increase in the production volumes (and the present results are much higher than in any previous five-year plan) was achieved through the growth in labor productivity. As far as the technical level of the power equipment being produced is concerned, the number of products certified with the State Seal of Quality has doubled and reached 70 percent. By the practical implementation of the slogan "For Each New Product, the State Seal of Quality", the collective is today producing 226 kinds of products with the honored pentagon. The course towards an intense expansion of production, modernization and placement of new capacities in service, as well as reconstruction have been taken and is being implemented in a clear cut fashion in the association. In the present five-year plan, modern industrial and engineering structures have appeared in our association, and no small amount of highly efficient, custom-made equipment has been placed in service, such as, shall we say, a special heavy horizontal boring machine with a large rotating table, a rotary milling machine tool, as well as machine tools of the "machining center" type having numerical program control and robot manipulators. Over the five year plan, some 5 shops and 13 sections have been comprehensively mechanized, 9 mechanized and automated lines have been placed in service and mechanized and automated warehouses have been constructed.

The most favorable possibilities for the introduction of progressive technological processes have been discovered. The methods of powder metallurgy, titanium alloy welding in a protective gas atmosphere, obtaining stator wedges from profiled roled steel and other new items have had a great impact. In a word, the changes have made a deep impression in each shop and section.

The party committee and the economic managers are striving to fully utilize the entire complex of ideological, political and organizational measures, so that the creative activity of people grows ever more, and so that the final result of the labor is optimal. The resolutions of the 25th Party Congress of the October (1980) Plenum of the CPSU Central Committee orient us towards this.

Considerable space is set aside for the development of power engineering and its material basis, power machine construction, in the realization of the great plans of the 11th Five-Year Plan. The ways of realizing the intensive program are planned in the Basic Directions Project Plan. Along with the construction of large thermal and water powered electric power stations, the construction of new AES's will continue on a wide scale. But equipment output must be significantly increased for this. It is necessary to have not only a quantitative growth in the production of reactors, generators and turbines, but also a sharp improvement their quality and technical-economic parameters.

The generators for the first nuclear electric power stations were fabricated in the "Elektrosila" association. And while the capacity of the first nuclear turbogenerators was 100,000 kilowatts, today, a machine has been designed in the association which is 10 times more powerful than these! During the days of the labor devoted to the 26th Party Congress, the million kilowatt generator designed for the Yuzhno-Ukrainskaya AES successfully underwent all-around tests in a unique testing facility of the association. Units of such capacity will be series produced during the 11th Five-Year Plan.

The association today has all of the capabilities of successfully carrying out the task assigned by the Leningrad party organization: bring the output of equipment for nuclear power engineering up to five to six million kilowatts annually. The task consists in simultaneously getting the staffs of the "Izhorskiy Plant" (the major supplier of reactors) and the "Leningrad Metal PLant" (the turbine manufacturer) up to this level of production development. This will also mean the creation of linked capacities in our city for the production of the full set of equipment for nuclear power stations.

Another integral part of the task is related to the fact that not simply reactors, turbines and generators with a unit capacity of one million kilowatts are required, but also those kinds of equipment which are designed and fabricated taking into account the specific features of adjacent sets. For they are to operate in a monoblock configuration. And for this reason, the units are to be coupled together as closely as possible - it will be easier to develop promising models of new equipment and standardize it.

The general director of the "Leningrad Metal Plant", O.A. Shishov wrote an article recently in Leningradskaya Pravda. He brought up a number of timely questions of the necessity of close interaction between the power machine builders of Leningrad who are actively participating in the accelerated development of nuclear power engineering. We are in complete agreement: the approach to the solution of a problem such as the design of coupled power generating capacities, which is by nature a comprehensive one, should also be comprehensive. And for this reason, we consider the coordination and the maximum possible combining of the efforts of the partners bound by common interests to be a proper matter, and of course, an essential one. It is an undisputed fact that the conclusion of an agreement on creative cooperation among the collectives of our three enterprises will best of all and most completely promote this end.

The Elektrosila workers are ready to sign it and become full andrightful participants in the community of power machine builders.

But for it to have the maximum results, it is essential, in our opinion, to eliminate the disproportion in the present planning. The traditional partner of "Elektrosila", the "Leningrad Metal Plant" association is designing and is preparing in the immediate future to set about the series production of turbines for AES's with a capacity of one million kilowatts, designed for 1,000 revolutions per minute. Elektrosila workers have fabricated a generator of similar capacity in a so-called quiet running variant. Our specialists are right now completing at a forced pace the working plans for a two-pole one million kilowatt generator with a speed of 3,000 revolutions per minute - the same one which will be installed in the monobloc with the turbine of the "metal plant". In reply to the appeal of the turbine builders, we have a counter proposal: have the generator ready not by the end of 1982, but several months earlier, simultaneous with the turbine of our partners. We are planning only three such generators for the 11th Five-Year Plan, while the remaining 14 are planned in the quiet running design. It is asked: with which generators will the "metal plant" turbines be working when they are put in series production, if it is not proposed that anyone be assigned the production of two-pole machines besides "Elektrosila"?

In my opinion, an entry should be made in the project plan of the CPSU Central Committee for the 26th Party Congress concerning the necessity of designing coupled capacities with respect to the production of equipment for nuclear power engineering, something which in and of itself will entail comprehensive planning of the production of turbines, generators and reactors which are most completely matched to each other. And the planning organs need make those corrections in an operationally timely manner in the program which would compensate for the gap cited here.

The best national economic results can be achieved with minimal labor and material resource expenditures. In practice though, this is not always successful. This is again true in many cases because of misfires which occur in the planning. We shall note that in the 10th Five-Year Plan, the association, by working from a careful analysis of capabilities, proposed the fabrication of 500,000 and 800,000 kilowatt generators, the demand for which today is great, greater than the number actually produced during these years. At the last minute, the ministry reduced the number of 500,000 kilowatters and 800,000 kilowatters, replacing them with the same capacity volume with sets of lower output. The shift in the products list lead to an increase in production expenditures and considerable tension in the work. And was it really impossible to predict beforehand how many and what kind of machines our economy would need?

Such a situation should not be repeated in the 11th Five-Year Plan. And it is no accident that the necessity of improving management, raising the level of economic control in all economic links and strengthening the orientation towards the achieving of better final results is noted in the major trends project plan. For this reason, I propose that the following be added to that section of the project plan where it talks about the consistent improvement in planning and the providing of organic interaction of the plan as well as economic levers and stimuli: in the case of unjustified corrections in the assignments, when the justified proposals of the enterprises are not taken into account, the ministries and departments should bear the material responsibility for this.

Of course, we also have our own difficulties. I will state frankly that not everything we have tried to do has been accomplished. Thus, the [illegible]tion and auxiliary shops still lag behind the major shops in terms of their technical equipment. The percentage of manual labor in the association is being reduced at an inadequate rate. The reconstruction of the insulation shop has been dragged out to an unjustified extent. We see these and other deficiencies and are applying all our efforts to eliminate them in the most immediate future.

However, in the future, a great deal depends in the improvement of labor efficiency and accelerating the development of nuclear power generator construction on those with whom "Elektrosila" is linked by common business concerns, and primarily, on the "Izhorskiy Plant" association, which provides us with castings and forgings, including heavy ones for turbogenerators. The year is over, and the forgings for the 800,000 kilowatter have not arrived from the Izhorskiy workers. The fabrication of two generators with a capacity of one million kilowatts is being held up for this same reason (the custom made machine tools in the first shop are idle).

Welded and forged multiple tonnage forgings are no longer required for the million kilowatt generators, just as for the turbines of the "Leningrad Metal Plant" corresponding to them, but rather solid-forgings. Their processing cycle in our shop is more than half a year. For this reason, in order not to disrupt the deadlines for the manufacture of nuclear turbines and generators, the smelting of the steel ingots should already be started at the "Izhorskiy Plant". However, the Izhorskiy workers are in no hurry. There is not only no agreement for the delivery of forgings concluded with the "Metal Plant", as G.A. Shishov writes, but there is also none with "Elektrosila", although our specialists have insistently proposed that it be concluded. For this reason, I completely share the concern of the general director of the "Leningrad Metal Plant".

"In carrying out the tasks of the upcoming five-year plan, which are enormous in terms of their social-political and national economic scales, states comrade L.I. Brezhnev in his welcoming speech to workers, engineers, technicians and service personnel of power systems, enterprises and construction projects as well as all power engineers, machine builders and workers in the fuel sectors of industry on the occasion of the 60th anniversary of the GOELRO plan, . . . the role of power engineering will grow even more. We should set about the realization of a new power engineering program, designed for the years just ahead as well as the long term. This program provides for a qualitative change in the structure of the fuel and power engineering complex, primarily through increasing the percentage of nuclear power engineering, the construction of large thermal electric power stations based on open pit coal deposits . . ."

Within the framework of realizing these grandiose scale transformations, the design of matched power capacities should become one of the major targeted programs in the development of Leningrad nuclear power machine construction. This means that the interaction of the enterprise partners should be directed towards a single goal, the attaining of which will have the greatest perceptible economic impact with the least expenditures.

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ELECTRIC POWER

HIGH VOLTAGE POWER TRANSMISSION EQUIPMENT

Moscow STROITEL'NAYA GAZETA in Russian 31 Dec 80 p 3

[Article by A. Markovich: "A Power Bridge of Great Length"]

> [Text] The scientific developmental work for high voltage direct current transmission lines has been completed. This will make it possible to come up with a simpler and faster solution to the problem of creating a single fuel and energy complex for the nation.
>
> In the 10th Five-Year Plan:
>
> --Project planning and estimate documentation totaling more than 10 billion rubles was produced.
>
> --Some eight institutes, initiators of a competition to reduce the metal consumption of the projects in the five-year plan, saved more than 700,000 tons of metal above the plan requirements.

The following task was before the scientists of the All-Union Electrical Engineering Institute imeni Lenin five years ago: design high voltage equipment capable of transmitting direct current power from Ekibastuz to Tsentr. In the 11th Five-Year Plan, the Ekibastuz energy should come into Tambov. The figures are impressive: the length of the line is 2,415 kilometers, the voltage is 1,500 kilovolts, the capacity is 6 million kilowatts and the transmitted power is 42 billion kilowatt-hours!

There has as yet been no experience in world practice with direct current power transmission at such levels and over such distances. Today, the prototype of the direct current high voltage substations is being installed in Moscow at the exhibition in Sokol'niki, and the last tests of the equipment on factory test stands are underway.

The testing hall of the institute, which is reminiscent of a large aircraft hangar, is tightly packed with metal cabinets, racks, cable bundles and high power insulators.

"If desired, one can trace the refinement of high voltage equipment here," relates the chief of the department, R. Lytayev. "Here are the installations operating on the Volgograd--Donbass direct current line; this mass of equipment is for the power transmission line to Finland, and here is part of the most modern substation."

"There is much new which is used in it. For example, light control using a high power semiconductor laser makes it possible to provide for practically simultaneous switching of the entire system with a precision of down to a millionth of a second. Along with this, there is the capability of monitoring the operation of each thyristor separately. All that remains for the operator is to monitor the lights on the control console. Another new item is the water cooling of the thyristors."

"And is direct current power transmission advantageous?" I ask my guide.

"Of course! First of all, energy losses are significantly reduced, and additionally, there is less work for the builders. There will be only two substations on the entire Ekibastuz-Tambov line. At the beginning and the end. And there are no compensating installations. Direct current lines have greater power transmission capabilities, and this is a very important factor today. Especially with our distances."

"Rem Aleksandrovich, and where else, in what other countries are such scientific developments underway?"

"They are working on this problem in West Germany, in the U.S. and in Japan. However, at the present day, there are no analogues in the world yet for our thyristor rectifiers and transformers."

"What about direct current lines of such length?"

"A similar line is being built in Brazil. We hope that our builders will manage to finish the Ekibastuz--Tsentr line ahead of th. Brazilians, and then we will be in first place in the transmission of large direct current power levels over great distances.

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ELECTRIC POWER

CEMA MEMBER NATION COOPERATION IN 'INTERELEKTRO' DISCUSSED

Moscow EKONOMICHESKOYE SOTRUDNICHESTVO STRAN-CHLENOV SEV in Russian No 5, 1980 pp 53-59

[Article by Aleksey Antonov, minister of the USSR electrical engineering industry and chairman of the "Interelektro" Council: "'Interelektro': The Impact of Cooperation"]

[Text] Improving production efficiency based on stepping up production and the efficient utilization of resources is the major development task of the national economies of CEMA member nations at the present stage. It can be said without exaggeration that the electrical power engineering industry is one of the important links in the resolution of this problem by practically all sectors. For it produces the electrical power equipment and hardware for electrical power generation, its transmission as well as distribution and consumption. And as is well known, its productivity depends in many regards on the electrical power to worker ratio.

Raising electrical power engineering in CEMA member nations is being accomplished in complete agreement with the goals and principles for the gradual bringing together and equalization of the levels of economic development of CEMA member nations, established in the Comprehensive Program. Especially rapid rates of growth in power engineering are observed in those nations where it was poorly developed prior to the establishment of the socialist order. Efficacious mutual assistance of the CEMA member nations and especially the USSR in setting up modern production has played a decisive role in the growth and shaping of the electrical power engineering industry of fraternal nations.

By making use of the advantage of the international socialist division of labor and relying on the planned nature of the socialist economy, these nations have gained the capability of organizing the highly specialized and large scale production of many kinds of electrical power engineering products with a guaranteed market.

Thus, series production has been set up in Bulgaria for ground type electric power transportation equipment: electrically powered loaders, electric trolleys and electric cable cars. About 90 percent of these products of the

"Balkankar" GKhO [State Economic Association] is delivered for export, primarily to socialist nations. The GDR ships out 70 to 80 percent of the electrical power engineering products manufactured in the republic to socialist nations. The Polish Peoples' Republic sends its partners more than 90 percent of the export of low voltage distribution and switchgear. The CSSR is the major supplier of main line passenger electric locomotives to the international socialist market. It occupies one of the leading positions in the world in their production.

Ties between Yugoslavian electrical power engineering industry and CEMA member nations are expanding. The SFRU sends about 90 percent of the complete distribution station packages to these countries, as well as more than 60 percent of the automatic cutout switches and about 80 percent of the power cables.

The Soviet Union is meeting the needs of other CEMA member nations for high power semiconductor devices, high power turbine and hydroelectric generators, large electrical machines, power cables and a number of other electrical engineering products.

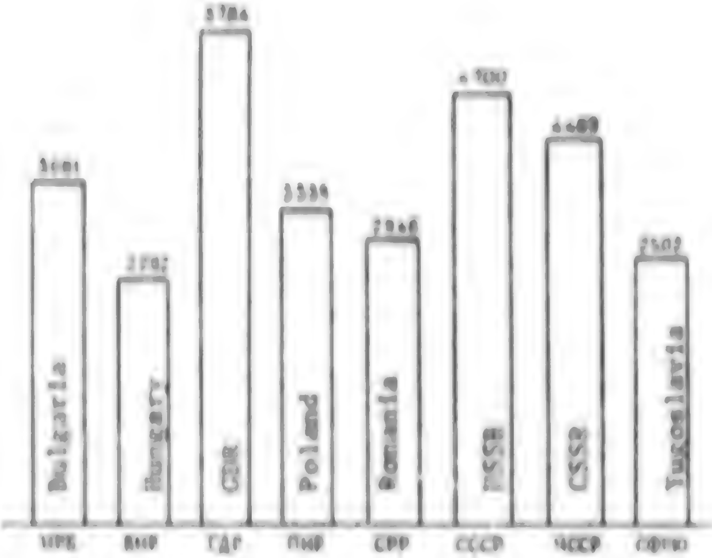
The rapid growth in the production and scientific-engineering potential of CEMA member nations, as well as the increase in the scales and deepening of their economic and scientific-technical cooperation in the electrical power engineering industry sector - all of this has necessitated the refinement and development of the forms and methods for international cooperation, the creation of the conditions for the comprehensive resolution of developmental problems of specialization and cooperation as well as the efficient utilization of production capacities and the expansion of multilateral scientific and engineering ties.

A qualititively new stage in the development of socialist economic integration was the formation of the international organization for economic and scientific-technical cooperation in the electrical power engineering: "Interelektro". The accord for its creation was signed by the plenipotentiary representatives of the governments of the Bulgarian Peoples Republic, Hungarian Peoples Republic, the GDR, Polish Peoples Republic, Socialist Republic of Romania, the USSR and CSSR in December of 1973, and went into force on July 14th, 1974. The SFRU joined in the accord in 1975.

The primary task of "Interelektro" is the assisting of the most complete satisfaction of the demands of the participating nations for high quality products. It accomplishes this by making use of the advantage of the international division of labor, expanding and strengthening economic and scientific-engineering ties based on good will and observing mutual interests.

With the formation of "Interelektro", the possibility for the organization of multi-lateral cooperation at the subsector level is created and is being realized. The time and stages required for the solution of specific problems have been sharply reduced and the depth to which specific measures are worked out as well as their efficiency have increased.

It can be asserted today with satisfaction that over the past years, considerable practical steps have taken in the given direction. The activity of



Electrical Power Generation per Person in the CEMA Member Nations and the SFRU in 1979

"Interelektro" in the production sector is concentrated on the resolution of such extremely important problems as organizing specialization and cooperation, developing production capacities, increasing the efficiency of mutually advantageous ties at the level of basic problem analysis, where these problems were characteristic of the previous period, as well as the development of the major trends in economic cooperation for the long term up to the years 1990 and 1995.

In the current five-year plan, 11 agreements on multilateral international specialization and cooperation in the electrical engineering industry have been signed and are already being successfully implemented. The agreements encompass a broad products list. Among them are: turbine and hydroelectric generators, large electrical machines, electric motors, low voltage equipment, cable products, high voltage insulators, illumination engineering products, semiconductor devices and converter equipment as well as special production process equipment.

Of special significance is the agreement concerning complete electrical power feed drives for numerical program controlled metal cutting machine tools. The participating nations here are the Bulgarian Peoples Republic, Polish Peoples Republic, Romanian Socialist Republic, the USSR and CSSR. This agreement is a part of the DTsPS [expansion unknown] on machine building.

The specialization of nations in the fabrication of definite kinds of products within the "Interelektro" framework, which has been established in the signed accords, has made it possible to increase the number of products which are fabricated by series production, improve labor productivity and reduce expenditures for product manufacture. It has made it possible for a number of nations to reduce the output of certain kinds of machines and equipment or to terminate the expansion of the relevant capacities. These nations meet their own needs for the given products by importing them from other nations participating in the accord. The fact that today the production of 85 percent of the products list of specialized products has been concentrated in one or two countries attests to the considerable amount of work done in this area.

As a result of the measures implemented by the "Interelektro" organs, the extent to which the demand of the nations for electrical engineering products has successfully been improved through the refinement of the structure and the development of mutual goods exchange. Prior to the creation of "Interelektro", the CEMA recommendations on electrical engineering product specialization encompassed no more than 120 positions. In the agreements in force in 1976-1980, the number of them has grown to almost 350.

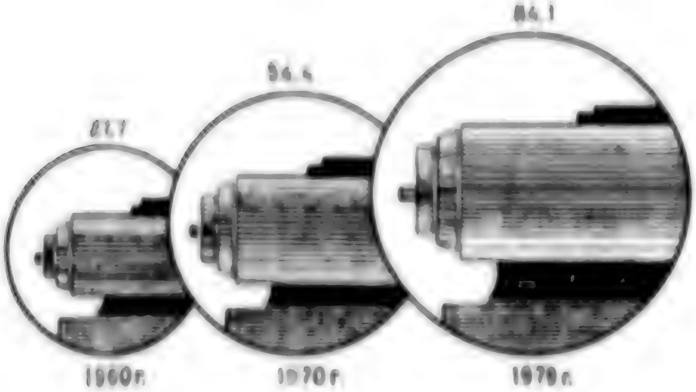
Cooperation in the production of component assemblies and parts is taking on increasingly greater importance today. Thus, the power transformers being produced in the USSR and delivered to the participating nations of "Interelektro", are equipped with switching devices from the NRB [Bulgarian Peoples Republic] and the GDR, and gas filled relays from the GDR. Semiconductor devices for the generators of the "Zhiguli" ("Lada") motor vehicles are being supplied by the USSR to the NRB, while the NRB provides AvtoVAZ with complete generators.

An important trend in "Interelektro" activity is the re-equipping of the electrical engineering and outfitting it with high performance production process equipment. In the current five-year plan, the specializing nations will deliver to their partners about 100 kinds of such equipment. Joint developmental work is underway on new machines for the manufacture of electric motors, lighting sources, semiconductor devices, cable products, etc.

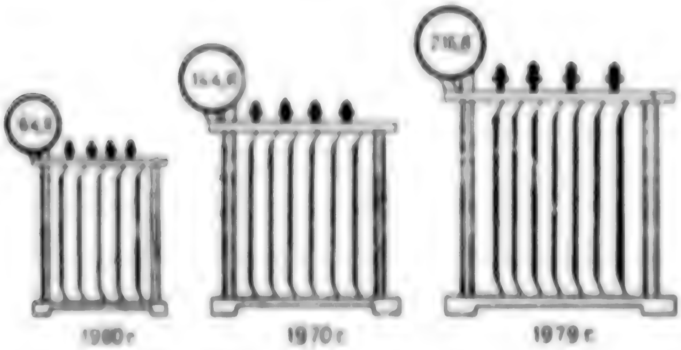
One of the most effective forms of cooperation which has been born through socialist economic integration is the construction of new enterprises with the participation of the interested nations. The bringing on line of the plant for the production of production process equipment at Novovolynsk (USSR) can serve as an example of such cooperation.

The plant was constructed on the basis of an agreement between the GDR, the Polish Peoples Republic and the USSR concluded in 1974. The Soviet Union developed the project planning documentation and managed the construction of the plant, while the GDR and the Polish Peoples Republic actively participated in outfitting it with modern metal cutting machine tools and production process equipment. The first stage of the plant was constructed within abbreviated deadlines. As early as 1977, production process equipment was manufactured here for engines and in 1979, the second and last stage was placed in service: the facility for the production of plant machine tools and automated lines for the production of electric motors, low voltage equipment and power supplies. In line with the agreement, deliveries of equipment were started to the GDR and the Polish Peoples Republic.

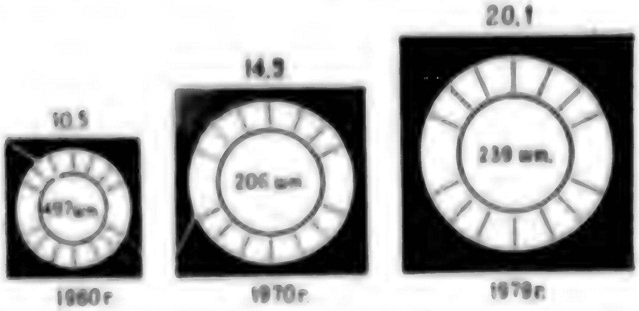
This efficient form of cooperation is undergoing further development in the "Interelektro" plan. At the 14th meeting of its council in May of 1980, a decision was made to prepare an agreement which provides for the joint construction of capacities for the production of electrical carbon and metal-ceramic products on USSR territory by the interested nations. The realization of this project will make it possible to meet the needs of the participating nations for the given products. At the present time, this problem is being solved to a considerable extent by imports from capitalist nations. The question of the organization of multilateral cooperation in the low tonnage production of varnishes and resins used as electrical insulation materials is also being worked on.



The Production of Alternating Current Electric Motors in the CEMA Member Nations (millions of KW).



The Production of Power Transformers in the CEMA Member Nations (millions of KVA).



[497 units] [206 units] [239 units]

The Production of Turbine and Hydroelectric Generators in the CEMA Member Nations (millions of KW)

Yet another important area of "Interelektro" activity is the implementation of comprehensive programs for cooperation in the design and production mastery of standardized series of electrical engineering products. Some 20 multilateral accords are being implemented today. They provide for the design and production mastery of products having wide applications in various sectors of the national economy, and will serve as the basis for the further expansion of production specialization and cooperation.

The comprehensive resolution of questions of project planning, product standardization, unifcation and the development of new production process equipment and technological processes is planned within the framework of these programs.

The combining of the efforts and the efficient utilization of the scientific and engineering potential of the participating nations in "Interelektro" will make it possible to shorten the timeframes for the design of new series and reduce the expenditures for their development, as well as speed up the introduction of products into series production. More than 150 scientific research institutes and production associations of the "Interelektro" participating nations are involved in work on the implementation of the comprehensive programs.

The realization of these programs will make it possible to design standardized series of asynchronous electric motors for a voltage of 6 KV, high power distribution transformers with capacities of up to 1,600 KVA, complete packages of distribution devices with solid insulation for voltage levels of 6 to 35 KV, automated current cutout switches for currents of from 10 to 600 amps, various kinds of illumination engineering and cable products as well as other electrical engineering products of a high technical level.

Work is underway at the present time through the combined efforts of the "Interelektro" participating nations on the design of asynchronous motors in the new AI (asynchronous "Interelektro") standardized series. They will be produced in a wide range of capacities from 0.25 up to 400 KV. Such a large experiment on an international scale is being carried out for the first time.

The joint scientific and engineering council for coordination in the field of low voltage asynchronous general service motors and modifications (ONTS AD) was created to carry out the joint work. The council has approved a network schedule which provides for a number of stages: the scientific research work, the development of the technical specifications, draft and engineering project plans and working documentation as well as widescale production of the series. Joint developmental work and the design of structural materials, production processes and equipment are also planned along with this. A working program has been drawn up for each stage and the coordinating party has been determined. Unified design and production process documentation has been created, in accordance with which the series production of the AI series motors will be set up.

The scientific and engineering cooperation being realized within the "Interelektro" framework is on a rather large scale. There are more than 80 topics in asynchronous motors alone, which encompass practically all of the problems related to their design and production. The distribution of the work among the partners has been accomplished taking into account the accumulated scientific potential, experience and engineering traditions of each country.

One of the efficient forms of cooperation which has become widespread during the implementation of this program is the Joint Design and Technological Office (OKTB). Specific problems in the development of a series are discussed at OKTB meetings, and the design and production process documentation is prepared. The specialists of all "Interelektro" participating nations take an active part in this.

This form of cooperation has been approved by the CEMA executive committee. It has recommended that the possibility of extending "Interelektro" experience to other organs and international organizations of CEMA member nations be studied.

We consider one of the major problems today to be the development and introduction of uniform CEMA standards for the most important kinds of products, as well as their unifications and standardization. At the present time, 61 CEMA standards have been authorized, which were developed by our organization. In the plan for 1980, provisions have been made for presenting yet another 50 standards for approval.

Production links among the enterprises and organizations of the "Interelektro" participating nations play an important role in the development and strengthening of the cooperation of our nations. Based on mutual advantage and comradely mutual assistance, they make it possible to solve specific problems: increase the technical level of products, labor productivity, etc. Contacts between the Yaroslavl' and Mogilev electrical machine construction plants (USSR) and the electric motor construction enterprises in Turma and Wernigerode (GDR) have already become traditional. In accordance with the agreement in force since February of 1973, a broad group of questions is being resolved, involving the reconstruction and improving the efficiency of production, boosting labor productivity through the introduction of modern technology, the joint development and utilization of automated control systems for technological processes (ASUTP's), etc.

A great achievement of the many years of cooperation of the staffs of the All-Union Scientific Research Institute for Illumination Sources (USSR) and the Hungarian firm of "Tungsram" was the creation of a high performance production line for the manufacture of incandescent lamps with powers of 40 to 100 watts, which has a productivity 2 to 2.5 times greater than for similar lines of capitalist companies.

A great friendship also ties the staffs of the Leningrad "Elektrosila" production association to the Czechoslovakian "ChKD-Praga" association and the Hungarian "Gants-Elektrik". Extremely important questions in refining the design and the fabrication technology for turbine and hydroelectric generators, as well as large electrical machines and other products are being resolved through the joint efforts of the scientists, engineers and workers of these enterprises.

At the present time, about 150 enterprises and organizations of the participating nations in "Interelektro" are taking part in cooperation on more than 160 topics. Multilateral international specialization and cooperation for production will undergo a significant expansion in 1981 - 1985. The products list of specialized

Products will more than double during this period. The volumes of mutual deliveries of such extremely important types of equipment as hydroelectric generators and large electrical machines will rise sharply, as well as deliveries of high voltage and instrument transformers, low voltage motors and contactors, cable products, production process equipment for the production of low voltage equipment, etc. It must be emphasized that there will be the possibility in the future as regards the majority of areas for more fully satisfying the needs of the "Interelektro" participating nations by means of deepening the international socialist division of labor and developing production capacities on this basis.

In order for cooperation to be improved and to become increasingly more reliable and efficient, it is essential to constantly coordinate it for the long term. Working out a long term strategy for the development of production, science and engineering based on forecasts, plays an important part here. In this regard, considerable work is underway within the "Interelektro" framework on an accord for the major directions of economic and scientific-engineering cooperation for the period up to 1990 and 1995.

As comrade L.I. Brezhnev pointed out in his greetings to the participants in the 33rd meeting of the CEMA Session, the major task consists of expanding the long term programs into a system of specific agreements, and transforming the subsequent two five-year plans into a period of intense production and scientific-engineering cooperation.

The work which has been developed within the "Interelektro" framework promotes the implementation of the measures provided in the DTsPS. The electrical engineering industry of the participating nations in "Interelektro" has played an active part in the construction of the 750 KV electrical power transmission line between Vinnitsa (USSR) and Al'bertirsha (Hungary). The construction of this line marked the beginning of parallel operation of the "Mir" power grid with the Unified Power System of the USSR, something which led to the formation of the largest international power engineering complex in the world. Within the framework of the DTsPS, the "Interelektro" participating nations are confronted in the fields of energy, fuel and raw materials with the resolution of a number of large national economic problems before 1990, which are related to the complete equipping of a series of 750 KV power transmission lines. Placing these lines in service will make it possible to provide for high reliability in the parallel operation of the integrated power system, exchange enormous flows of electrical power and service the intersystem power grid with 4,400 MW of power. This will provide a real savings of capital investments for the countries, create the conditions for bringing power sets with a unit capacity of 1,000 MW and above on line and render emergency mutual assistance on a considerable scale.

An agreement on the joint construction of a 750 KV power transmission line between the USSR and the Polish Peoples Republic was concluded in March of 1978 between the Hungarian Peoples Republic, the GDR, the Polish Peoples Republic, the USSR and CSSR. It will be possible to transmit up to 12 billion KWH of electrical power annually through this line.

As is well known, the resolution of the power engineering problem in fraternal nations is closely tied to the development of nuclear power engineering. It is planned that AES with a capacity of 37 million KW will be brought on line in the

European member nations of CEMA and the Republic of Cuba by 1990. The participating nations in "Interelektro" are taking an active part in carrying out this great project, and in particular, in the implementation of the agreement of international specialization and cooperation in production and mutual deliveries of equipment for nuclear electric power stations in the period 1981-1990, signed during the 23rd meeting of the CEMA session in Moscow.

Much is also being done by the "Interelektro" participating nations for the realization of the DTsPS in the field of machine building. In particular, an agreement has been concluded on multilateral specialization and cooperation in the production of complete electric drives for the primary drive systems of metal machine tools with numerical program control in the period up to 1985. In this regard, additional measures are yet to be implemented for the development of new capacities in the participating nations of "Interelektro" for the fabrication of the electric drives. This will make it possible to better satisfy the demand of the interested CEMA member nations and the SFRU.

The totals and results of "Interelektro" activity were considered at the 93rd session of the CEMA Executive Committee. The considerable work done by the organization for the expansion of economic and scientific-engineering cooperation was noted. Resolutions were adopted, directed towards the further improvement of its activity.

Taking these resolutions into account, "Interelektro" is today concentrating its efforts on the expansion and deepening of the international socialist division of labor based on increasing the concentration of production, the efficient utilization and coordinated development of capacities, boosting the technical level and competitiveness of products, refining the forms of cooperation in the area of product distribution, etc.

A good base for the implementation of these measures will be the completion of the implementation of the comprehensive programs for cooperation in the design and production mastery of standardized series of electrical engineering products and production process equipment, providing for the efficient execution of the agreements concerning specialization and cooperation in production during 1981--1985 and the implementation of the set of measures for the coordination of plans, taking into account the coordinated major trends in the development of economic cooperation among "Interelektro" participating nations.

We can attest to the fact today that the important problems in electrical engineering practice and science, on which the further rise in the national economy of the nations of socialist cooperation depends, are being successfully resolved through the joint efforts of the participating nations in "Interelektro" based on the principles of a socialist division of labor.

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ELECTRIC POWER

IMPACT OF POWER SUBSTATION DEFICIENCIES ON NEW RESIDENTIAL CONSTRUCTION

Moscow MOSKOVSKAYA PRAVDA in Russian 27 Jan 81 p 1

[Article by Ye. Korobkina: "Moscow's Experience, a Gift of Labor"]

[Text] An increasing number of residential apartment houses are going up in our city every year in accordance with improved project plans. But the engineering equipment for the framing structures, their "stuffing" so to speak, does not always get updated at the same rate as the new series of buildings are introduced into practice. And this is explainable in general: almost every new item of technical equipment travels a long road from conception to introduction - the development of the project plan, the fabrication of prototypes, their testing and so forth. This is why at times in comfortable apartment houses in new settlements, the mood is ruined, it would seem, because of such a trifle as a burned out bulb. However, this means that the refrigerator and stove are disconnected, you do not do the washing, you do not iron the linens and there is no light and no music.

"Up until now, in regions of new construction projects, one large apartment house with 10 entrances, in which thousands of residents live, was serviced with electrical power from two types of transformer substations," says the chief engineer of the Mospromelektrokonstruktsiya production association, V. Borisov, "The first is easy to manufacture, install, set up and operate, but is at times unable to meet the needs of the residents of even one apartment house. The second is more reliable and has a higher capacity, but is expensive. Complex equipment is installed in it, which is difficult both to manufacture and operate. In order to eliminate the slightest minor defect, the intervention of highly skilled electricians is required. As a rule, it is necessary to call on the specialists of the Moscow Power System cable network."

They are the ones, the workers of the Moscow Power System who have given some thought to how to combine the advantages of one substation with the other, eliminating the deficiencies of both. At their order, the specialists of the Mospromelektrokonstruktsiya association of the Main Moscow Special Construction and Installation Administration and Mosproyekt-1 developed an all-purpose modularly packaged transformer substation.

The production of the new installation is simpler and more economical than previous ones. Labor expenditures for the fabrication of the equipment have been reduced, less metal is used in the products and the area occupied by the substation on the territory of the microrayon is smaller. And the most important thing, a higher degree of operational reliability has been achieved.

The capacity of such a substation is 1,260 kilovolt-amperes. Any fault can be eliminated by an electrician of the regional residential administration. The use of the new substation will yield a savings of more than 600,000 rubles annually.

Setting up production of the all-purpose facility has been assigned to the staff of the Mospromelektrokonstruktsiya association. Prototypes were fabricated here at the end of the past year. As tests have shown, the installation and debugging of the equipment is accomplished much more rapidly than before, and this means that the residential structures will be placed in service more quickly.

The series production of electrical equipment for new substations will start in February. This will be the gift of labor of the staff to the party congress.

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ELECTRIC POWER

CRYOGENIC ELECTRICAL POWER TURBINE GENERATOR CONSTRUCTION DISCUSSED

Moscow SOVETSKAYA ROSSIYA in Russian 7 Dec 80 p 1

[Article by D. Vladimirov, Leningrad: "The Energy of Coldness"]

[Text] The tests of the first domestic cryogenic turbine generator with a capacity of 20,000 kilowatts (the KTG-20) have started these days at the All-Union Scientific Research Institute for Electrical Machines. This marks the next step in the creation of a fundamentally new technology. The collective of scientists and specialists has developed a custom-made unit, which by rights will be one of the major directions for the development of our power engineering in the future.

Life itself has forced designers to seek out ways of designing such turbine generators. It has been theoretically demonstrated today that it is practically impossible to construct a plant with a unit capacity of more than 3 million kilowatts using traditional, classical methods. The "ceiling" here is limited by an entire series of physical laws.

This is why specialists remembered the unique reserves of deep cold, which is capable of becoming an excellent assistant in the generation of electrical power.

A laboratory prototype of a cryogenic turbine generator with a superconducting excitation winding and a capacity of 1,200 KW was tested a few years ago in our nation. And now the next generation of machines, the capacity of which has grown by a factor of almost 20, is passing the exam. A fundamentally important fact is that the new unit already bears the name of "industrial prototype".

"Special days are upon us," says the deputy chief design engineer of the cryogenic turbine generator, Anatoliy Anatol'yevich Karymov. "We are totalling up the activity of the staff of the institute headed by academician I.A. Glebov concerning the carrying out of the task of state importance. For right now, on the threshold of the 26th CPSU Congress, all of the nation's collectives are looking back, checking the implementation of the directives of the previous party forum. And in the documents adopted five years ago, in the section devoted to the development of industry, it is stated directly: "step up work on the design of high power generators using the principle of superconductivity." Metal consumption in the present new cryogenic unit has been cut in half, while the efficiency has been successfully boosted by 0.5 percent."

By the way, a larger cryogenic turbine generator with a capacity of 300,000 KW is now being designed by scientists at the "Elektrosila" association.

Such famous collectives as the Leningrad "Izhorskiy Zavod", "Elektrosila", the "Krasnyy Vyborzhets" and the "Proletarskiy Zavod" associations as well as the Moscow "Geliymash" association particpated in the design of the KTG-20.

What do the scientists expect from the tests of the cryogenic turbine generator which have started? First: obtain confirmation of the basic design principles. Second: ascertain the characteristics inherent in the new unit. The tests will make it possible to come up with a more specific design for the next generation of "energy factories", based on the principles of ultralow cooling. And then the appearance of ultrahigh power industrial cryogenic turbine generators will become real even before the end of the present century.

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ELECTRIC POWER

TREND TOWARDS GAS COOLED FAST NEUTRON POWER REACTORS DISCUSSED

Minsk SOVETSKAYA BELORUSSIYA in Russian 7 Feb 81 p 3

[Article: "The Gas 'Arteries' of Reactors"]

[Text] The capability of designing a compact and powerful nuclear electric power station with a very simple configuration is opened up through the use of a universal coolant, proposed by Belorussian physicists. In contrast to the liquid sodium used in fast neutron reactors, the dissociating gas "nitrin" has little sensitivity to radioactivity, removes heat from the nuclear "furnace" at a faster rate and is itself capable of driving the station turbine.

The proofs of this are the results of research, experiments and calculations which were reported by the associates of the Institute of Nuclear Power Engineering of the BSSR Academy of Sciences at the Fifth All-Union Conference on the Application of Dissociating Gases, which took place February 3rd-5th in Minsk. Under the scientific supervision of the institute, and in conjunction with it, research, project planning and design organizations of the USSR State Committee on the Utilization of Nuclear Power did planning and developmental work on an experimental industrial AES with a gas cooled fast neutron reactor having a capacity of 300,000 KW. The scientists of the RSFSR, the Ukraine, Moldavia and Latvia are likewise participating in this work, and within the CEMA framework, also specialists from Poland, Bulgaria and Hungary. The results of what had been done and the planned paths for further research were reported at the conference.

"No matter how rich we are in hydrocarbon raw materials, on which thermal electric power stations operate, its reserves are not infinite, and they are located distant from the major power users," said the Deputy Chairman of the USSR Gosatom and winner of the Lenin and State prizes, N.M. Sinev. "For this reason, a provision is made in the plan of the CPSU Central Committee for the 26th Party Congress for the advanced development of nuclear power engineering to improve the nation's fuel and energy balance. In the upcoming decade, it will be based on the utilization of high power water-cooled reactors which have been well tested in operation. However, they make inefficient use of natural uranium: a large part of it is lost in wastes. This is why the changeover of nuclear power engineering to fast neutron reactors is planned in the long term, where these reactors make several tens of times better use of the nuclear fuel through its increased breeding in the form of plutonium isotopes. Power generating plants based on a dissociating coolant, which can also serve as the working material of the AES, are also of interest. The regular all-union conference was also devoted to studies of this important direction in engineering, which is being fruitfully developed by Belorussian scientists. The program outlined by its participants will assist in speeding up the design of the first experimental industrial nuclear electrical power station in the USSR with a fast neutron reactor using a dissociating gas.

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ELECTRIC POWER

NUCLEAR POWER REACTORS FOR DISTRICT HEATING DISCUSSED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 30 Jan 81 p 2

[Article by V. Boldyrev, chief of the department of technical and economic research and long term developmental work of the All-Union Scientific Research Institute for Nuclear Electric Power Stations, Moscow: "For the Needs of District Heating"]

[Text] You involuntarily recall the pithy saying of D.I. Mendeleyev, "One can also stoke the furnace with banknotes", when you see the oil-fired equipment being sent to TETs's. For this reason, the entry in the plan of the CPSU Central Committee for the 26th Party Congress produces a feeling of deep satisfaction: ". . .curtail the consumption of oil and petroleum products as a boiler and furnace fuel through a stepped-up pace of nuclear power engineering development."

Our nation is the motherland of the peaceful use of nuclear energy. After the creation of the first nuclear electric power station in the world at Obninsk in 1954, Soviet nuclear power engineering, having passed the stage of industrial prototypes of the power units, was introduced on a wide scale into the nation's electrical power engineering. Today, it is based on two types of reactors: water-moderated water-cooled and water-cooled graphite-moderated reactors. In 1980, a pilot unit with a VVER-1000 water-moderated water-cooled reactor was placed in trial industrial operation at the Novovoronezhskaya AES. And a pilot power unit with a water-cooled graphite-moderated RBMK-1500 reactor will be brought on line at the Ignalinskaya AES. It is conjectured that the capital outlays per installed kilowatt will fall off by 10 to 12 percent, and the fuel component of the electrical power generation cost will be reduced by 25 to 30 percent.

It is specifically the new reactors with a large per unit capacity and a high utilization factor (on the order of 0.8 to 0.9) that will provide for the reliable generation of electrical power. By 1985, up to 220 - 225 billion kilowatt-hours of it will be generated at nuclear electric power stations. It is presupposed that new capacities will be brought on line - 24 to 25 million kilowatts in all. The Smolenskaya, Kalininskaya, Kurskaya, Balakovskaya and Rostovskaya AES's will go fully on line in the 11th Five-Year Plan. Construction will begin on the first units and they will be placed in service at the Khmel'nitskaya, Zaporozhskaya and Krymskaya AES's.

All of the AES's constructed up to the present time are intended to cover the major load of the power systems. But in the project plan of the CPSU Central

Committee, it is correctly proposed that nuclear fuel be used to cover the variable portion of the load through pumped-storage electric power stations (GAES's). In this case, stable operation of AES reactors is maintained, something which is extraordinarily important to assure their economical and reliable operation. The first such power complex is already being constructed as part of the Yuzhno-Ukrainskaya AES, the Tashlykskaya GAES and the Konstantinovskaya GES-GAES.

The problem of heat supply for the European area of the USSR is especially severe. For this reason, it is also planned that work on the use of nuclear fuel to generate thermal power will be continued, as well as the expansion of the construction and the bringing on line of the first power units at the Odesskaya nuclear TETs. It should be noted that the combined generation of heat and electrical power in nuclear power engineering has proved to be more economical tha the separate generation of heat by nuclear powered boilers and electrical power by nuclear condensation electric power stations.

Unfortunately, the construction of specialized nuclear TETs's is limited by machine building capabilities. However, it is altogether possible to increase heat output from district heating facilities of nuclear condensation electric power stations. Such a facility was placed in service at the Beloyarskaya AES as early as the 1960's and demonstrated high efficiency in the utilization of heating steam taps for the heat supply.

It is thought that the project plan of the CPSU Central Committee for the 26th Congress should be supplemented with the assignment: "For the purposes of further reducing the consumption of organic fuel and preventing the pollution of the atmospheric environment in cities and settlements, make a provision for increased steam extraction for district heating and nuclear condensation electric power stations." I am confident that the widescale incorporation of nuclear fuel into the nation's fuel and energy balance will promote the further progress of our society.

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ELECTRIC POWER

BRIEFS

SURGUT GAS REFINERY--Tyumen'. Several byproduct gas flares in the Western Siberia oil field have been extinguished. The valuable raw material is now sent to the Surgutsk gas refining plant, the first stage of which has been placed in operation. A complex of enterprises for reprocessing byproduct gas into dry fuel and astable gasoline with an overal annual capacity of up 15 billion cubic meters of raw material is in operation in the Tyumen' North. The utilization volumes of natural gas will double in the present five-year plan. [Text] [Moscow KRASNAYA ZVEZDA in Russian 6 Jan 81 p 1] 8225

IRGANAYSKAYA GES IN DAGESTAN--In meeting the precongress obligations, the collective of the Leningrad division of the Gidroproyekt Institute imeni S. Zhuk completed the developmental work on the engineering documentation for the construction of the Irganaskaya GES in Dagestan. A rock and earth dam 111 meters high is going up on the Averskoye Koysu River. The capacity of the station is 800,000 KW. There will be four hydroelectric sets in operation here. The project plan calls for the construction of a road which will more than cut in half the trip from Makhachkala to the future GES. "Our designs call for the comprehensive utilization of the hydroelectric resources," emphasized the deputy chief engineer of Lengidroproyekt, K. Vasil'yev. "Bringing the station on line will not only provide for inexpensive electrical power, but will also make it possible by using the water reservoir to successfully solve the problem of irrigating several tens of thousands of hectares of vineyards and orchards." The preparatory work is being stepped up these days in the region of the future Irganayaskaya GES. The construction of the auxiliary enterprises is underway. The construction of a large section of the new route has been completed and the tunnel is being driven. [V. Alyushinskiy] [Text] [Moscow IZVESTIYA in Russian 14 Jan 81 p 3] 8225

POWER FOR TURKMEN AGRICULTURE--Ashkhabad. Various colored lights flared on one panel of the central dispatcher control center for the power system of the republic: power had arrived via the Kizyl-Atrek - Madau electric power line just a few kilometers more than 70 km long. With the arrival of industrial power in the valley of Atrek River, the production of citrus, figs, pomegranates and olives will increase, as well as their processing and storage. Along with economic issues, social question of the development of the kolkhozes and sovkhozes located in this region will also be resolved more successfully. In the last five-year plan, the power engineering workers of the Turkmen SSR erected 4,500 kilometers of high voltage and distribution electric power lines. This increased the power to worker ratio in cotton growing and animal husbandry and improved labor productivity in agriculture. [S. Kim] [Text] [Moscow SEL'SKAYA ZHIZIN' in Russian 30 Jan 81 p 4] 8225

PAUZHETSKAYA GEOTHERMAL POWER STATION--Petropavlosk-Kamchatskiy, 31--The second stage of the Pauzhetskaya geothermal electric power station has been placed in service. As a result, the capacity of the first geothermal electric power station in the nation has more than doubled. This will make it possible to provide a reliable electrical power supply to the maritime settlement of Ozernovskiy and the fish canning plant, as well as assist in the development of an important economic region of Kamchatka. Intensely cold weather now predominates and deep snow lies in the valley of the Pauzhetka River where the station is located. And, as always, the grass is green. The underground heat makes the gift of a piece of springtime with an area of several hectares to the people. It also gives energy to the station turbine. [I. Pavlikhin] [Text] [Moscow PRAVDA in Russian 1 Jan 81 p 2] 8225

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